

## **Trent Morgan Guess, Ph.D.**

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### **Education**

- December, 2003 Doctor of Philosophy, Mechanical Engineering  
University of Kansas, Lawrence, KS  
Dissertation Title: "Computational Modeling of a Dynamic Knee Simulator"
- August, 1994 Master of Science in Mechanical Engineering  
Colorado State University, Fort Collins, CO  
Thesis Title: "Design and Construction of a Magnetic Levitation Apparatus"
- December, 1992 Bachelor of Science in Mechanical Engineering  
University of Kansas, Lawrence, KS

### **Current Positions**

HealthSouth Professorship, University of Missouri  
Associate Professor, Department of Physical Therapy, Department of Orthopaedic Surgery, University of Missouri  
Director, Mizzou Motion Analysis Center  
Adjunct Professor, Department of Bioengineering, University of Missouri

### **Honors**

- 2017 Excellence in Education Award, University of Missouri. This award recognizes educators who contribute to student learning and personal development through out-of-the classroom experiences.
- 2016 Top 3 University Winner, 2016 Simulating Reality Contest, MSC Software.
- 2013 2<sup>nd</sup> Place, Grand Challenge Competition to Predict *In Vivo* Knee Loads. An international competition to predict knee contact forces using experimental gait lab measurements.
- 2007 Faculty Scholar Award, University of Missouri – Kansas City (UMKC). An award for faculty who show exceptional early accomplishments and promise for outstanding future research.
- 2002 Elisabeth M. and Winchel M. Parsons Scholarship, American Society of Mechanical Engineers Auxiliary
- 2001 Robert M. Carey Scholarship, University of Kansas
- 2000 – 2003 Hogleund Graduate Fellowship, University of Kansas
- 1991, 1992 School of Engineering Honor Roll, Dean's Honor Roll, University of Kansas

### **Honor Societies**

Phi Kappa Phi National Honor Society (since 2002)  
Tau Beta Pi National Engineering Honor Society (since 1992)  
Pi Tau Sigma Mechanical Engineering Honor Society (since 1991, Treasurer, 1992)  
Golden Key National Honor Society (since 1991)

### **Honors for Mentored Students**

- 2017 First Place, Clinical Science, University of Missouri Health Sciences Research Day  
Swithin Razu, Doctoral Student

- 2017 Mizzou Advantage Graduate Travel Grant  
Swithin Razu, Doctoral Student
- 2016 Dean's SSRA 2016 International Research Scholarship, University College Dublin  
Derick Davis, Summer Researcher
- 2016 Excellence in Undergraduate Research Award, Honorable Mention, Art and Design Category, MU  
Nicholas Bira, Undergraduate Researcher
- 2016 Gait and Clinical Movement Analysis Society Travel Award, Memphis, Tennessee  
Swithin Razu, Doctoral Student
- 2015 University of Missouri Health Sciences Research Day Poster Award, First Place, Clinical Science  
Portia Flowers, Post-Doctoral Fellow
- 2015 School of Health Professions Health Sciences Research Day Dean's Award  
Swithin Razu, Doctoral Student
- 2015 School of Health Professions Health Sciences Research Day Dean's Award  
Portia Flowers, Post-Doctoral Fellow
- 2015 American Society of Biomechanics Diversity Travel Award, Columbus, Ohio  
Portia Flowers, Post-Doctoral Fellow
- 2015 University of Missouri Comparative Orthopaedic Laboratory Excellence in Research Award  
Swithin Razu, Doctoral Student
- 2015 Image-Based Biomedical Modeling Summer Course Fellowship, Park City, Utah  
Swithin Razu, Doctoral Student
- 2015 7<sup>th</sup> Conference on Understanding Interventions to Broaden Participation in Science Careers Travel  
Award, San Diego, California, Portia Flowers, Post-Doctoral Fellow

## Academic Service

### Courses Taught:

ME 352	Instrumentation & Measurements I <sup>+</sup>	(F03, F04, F05, F06, F07, F12)
ME 362	Instrumentation & Measurements II <sup>+</sup>	(W04, W05, W06, W07, W08, W13)
ME 420	Human Powered Vehicle Design <sup>+,*</sup>	(Su05, Su06, Su07, F09, F10, F11)
ME 412/5512	Biodynamics <sup>+,*</sup>	(F05, F06, F07, W09, W11, W13)
ME 457/5557	Mechatronics System Design <sup>+,*</sup>	(W06, W07, W08, W09, W10, W11, W12)
ME 5618	Advanced Dynamics <sup>+,*</sup>	(F08, F11)
VMS 8423	Comparative Arthrology <sup>-</sup>	(F14)
PHTHR 8085	Human Kinesiology <sup>-</sup>	(F15, F16, F17)

<sup>+</sup> University of Missouri – Kansas City (UMKC)

<sup>\*</sup> New course developed

<sup>-</sup> Team taught

### Faculty Advisor:

American Society of Mechanical Engineers, UMKC Student Section  
 Human Powered Vehicle Challenge, UMKC, American Society of Mechanical Engineers  
 2<sup>nd</sup> Place Overall, East Coast Competition, 2006  
 8<sup>th</sup> Place Overall, East Coast Competition, 2007  
 7<sup>th</sup> Place, Speed Class, East Coast Competition, 2010  
 2<sup>nd</sup> Place, Women's Speed Event, East Coast Competition, 2013  
 4<sup>th</sup> Place, Men's Speed Event, East Coast Competition, 2013

**University Level Committees:**

MU Faculty Council, 15/16, 16/17, 17/18  
MU Fiscal Affairs 17/18  
MU Academic Affairs, 15/16, 16/17  
Graduate Council, UMKC, 10/11, 11/12, 12/13  
Hospital Hill Research Facility, UMKC, 2010  
Strategic Planning Initiative, Life and Health Sciences Subcommittee, UMKC, 08/09

**School Level Committees:**

School of Health Professions Third Year Review, 15/16  
School of Health Professions PhD, 14/15  
School of Health Professions Senior Grant Writer Search, 14, 17  
Budget, UMKC, 05/06, 06/07, 07/08

**Department Level Committees:**

Department of Physical Therapy Faculty Search, 16/17  
Department of Physical Therapy Third Year Review, 16/17, 17/18  
Athletic Training Faculty Search, 15  
Physical Therapy Scholarly Activity, 14/15  
Director of Graduate Studies for Mechanical Engineering, UMKC, 09/10, 10/11, 11/12, 12/13  
Academic, UMKC, 04/05, 05/06, 06/07, 07/08, 08/09  
Mechanical Engineering ABET Lab Coordinator, UMKC, 03/04, 04/05, 05/06, 06/07, 07/08  
Mechanical Engineering Faculty Search, UMKC, 05/06, Chair 07/08, Chair 09/10  
Graduate Program Committee, UMKC, 07/08, 08/09, 09/10, 10/11, 11/12, 12/13

**Students Mentored in Research (Primary Advisor):**

Jyothi Rayaprolou, M.S. 2005 UMKC "Controlling Quadriceps Forces Based on Predicted Retro-patellar Stresses in a 3-D Dynamic Model of the Knee Joint"

Katherine Weimer, M.S. 2007 UMKC "Development and Validation of a Subject-Specific Computational Human Knee Model in a Dynamic Knee Simulator to Include Ligament and Tendon Bone Wrapping"

Donald Wilcox, M.S. 2007 UMKC "Optimizing Engineering Design of a Pneumatic Valve with Mathematical Modeling and Design of Experiments"

Aarthi Shankar, M.S. 2007 UMKC "Optimization of Quadriceps Force Distribution for Minimization of Patellofemoral Contact Pressure During a Squat"

Gavin Paiva, M.S. 2010 UMKC "Development of Multibody Soft Tissue Models and Their Tuning to Experimental Data: With a Focus on the Canine Meniscus"

Leo Olcott, M.S. 2010 UMKC "Validation of a Subject Specific Canine Hind Limb model with Emphasis on an Anatomical Stifle"

Paul Wilson, M.S. 2011 UMKC "Optimization of Ligament Parameters on a Subject-Specific Computational Human Knee Model in a Dynamic Knee Simulator using Design of Experiments"

Mohammad Kia, IPh.D. 2011 UMKC "A Musculoskeletal Model of a Subject Specific Knee Joint with Menisci During the Stance Phase of a Walk"

Katherine Bloemker, IPh.D. 2013 UMKC "Modeling the Soft Tissues of the Knee Joint"

Munsur Rahman, M.S. 2013 UMKC "Development and Validation of a Computational Multibody Model of the Elbow Joint"

Hamidreza Jahandar, M.S. 2015 "Concurrent Simulation of a Subject Specific Musculoskeletal Model with Anatomical Knee"

Swithin Razu, Ph.D. May 2018 Expected

Amir Jahandar, M.S. May 2018 Expected

Undergraduate Researchers: Hakim Khan (Su 2004), Katie McNutt (Su 2005), Katherine Weimer (Su 2005), Geminia Carey (Su 2006), Fernando Nussenbaum (Su 2006), Seth Powers (Su 2007), Jessica Hettinger (Su 2007), Seth Powers (Sep. 07 – June 08) funded through National Science Foundation Research Experience for Undergraduates Supplemental Grant (Award # 05062970), Leo Olcott (Sep. 07 – June 08) funded through National Science Foundation Research Experience for Undergraduates Supplemental Grant (Award # 05062970), Vicki Zhelyazkov (Su 2009), Frances Zhu (Su 2011, Su 2012), Lauren Bradley (Su 2014), Conner Hazelrigg (Su 2014), Patrick Kirk (Su 2014), Morgan Sloan (Su 2014), Dillon Noland (S 2015), Austin Koester (Su 2015 – S 2016), Akash Patel (F 2015, S 2016), Reimon Brown (F 2015), Abbigale Brinkhorst (S 2016), Nicholas Bira (F 2015, S 2016), Matthew Guess (Su 2016, Su 2017), Derick Davis (Su 2016), Sami Kurkowski (F 2016, S 2017, Su 2017), Blair Twaddle (F 2016, S 2017), Becca Anglen (Su 2017)

### **Post-Doctoral Employees Supervised:**

Portia Flowers, Ph.D. August 2014 – July 2016

Antonis Stylianou, Ph.D. June 2010 – July 2014

Mahbube Siddiki, Ph.D. September 2012 - May 2013

Mohammad Kia, Ph.D. January 2012 – February 2013

Yunkai Lu, Ph.D. June 2011 – November 2012

Hongzeng Liu, Ph.D., October 2007 - December 2009

### **Academic Development:**

New Faculty Teaching Scholars Program, University of Missouri System, 04/05

## **Professional Service**

### **Membership and Licensing:**

Orthopaedic Research Society, Meniscus Research Section

American Society of Mechanical Engineers

American Society of Biomechanics

Gait and Clinical Movement Analysis Society

Engineer in Training, Kansas (2001)

### **Experience:**

2014 - Director, Mizzou Motion Analysis Center, Columbia, MO

2013 – HealthSouth Professorship, University of Missouri, Columbia, MO

2013 – Associate Professor of Physical Therapy, University of Missouri, Columbia, MO

2013 – Associate Professor of Orthopaedic Surgery, University of Missouri, Columbia, MO

2013 – Adjunct Professor in the Department of Bioengineering, University of Missouri, Columbia, MO

2012 – 2013 Franklin D. Dickson Endowed Associate Professor of Orthopaedic Research, University of Missouri – Kansas City, Kansas City, MO

2009 – 2013 Associate Professor of Mechanical Engineering, University of Missouri – Kansas City, Kansas City, MO

2008 – 2013 Adjunct Professor in the Department of Orthopaedic Surgery, University of Missouri – Kansas City School of Medicine, Kansas City, MO

2003 – 2009 Assistant Professor of Mechanical Engineering, University of Missouri – Kansas City, Kansas City, MO

2002 – 2003 Graduate Research Assistant, University of Kansas Medical Center, Kansas City, KS

2002 Graduate Teaching Assistant, University of Kansas, Lawrence, KS

2000 Electro-Mechanical Design Engineer, Aerotech Engineering and Research Corporation, Lawrence, KS  
1997 – 1999 Servo Engineer, Maxtor Corporation, Longmont, CO  
1994 – 1997 Mechanical Design Engineer, Maxtor Corporation, Longmont, CO  
1993 – 1994 Graduate Teaching Assistant, Colorado State University, Fort Collins, CO

**Activities:**

Executive Committee, Communication Chair, Orthopaedic Research Society, Meniscus Section, 2016 - 2018  
Chair, Tissue Mechanics Working Group, Interagency Modeling and Analysis Group (IMAG), Multiscale Modeling Initiative, 2005-2010

Orthopaedic Research Society, Meniscus Section Membership Taskforce, 2016

Guest Editor, Journal of Knee Surgery, 2015

Editorial Board Member, Journal Advances in Biomechanics and Applications, 2013 -

Grant Reviewer

Department of Defense Congressionally Directed Medical Research Programs, Peer Reviewed Medical Research Program, Orthopedic Medicine Panel (Bone Regeneration and Post-Traumatic Osteoarthritis), Panel Member, 2016

National Institute of Biomedical Imaging and Bioengineering, ZEB1 OSR-C, Multiscale Modeling Program Review Member, 2016, 2017

Orthopaedic Research and Education Foundation Goldberg Arthritis Research Grant Peer Review Committee, 2016

National Science Foundation Nano/Biomechanics Program, Panel Member, 2006

Rehabilitation Research and Development (SPiRE) Program, Department of Veterans Affairs, 2013, 2014  
Arthritis Research Campaign, United Kingdom

Netherlands Organization for Health Research and Development

University of Kansas Medical Center Research Institute Grants Program

University of Missouri Research Board

Journal Reviewer

Journal of Biomechanics

Journal of Biomechanical Engineering

Journal of Orthopedic Research

Journal IEEE Transactions on Biomedical Engineering

Journal Medical Engineering and Physics

Journal of Computer Methods in Biomechanics and Biomedical Engineering

Journal of Applied Biomechanics

Journal of Multibody System Dynamics

Journal Computers in Biology and Medicine

Journal Advances in Biomechanics and Applications

Journal Computational and Mathematical Methods in Medicine

Journal of Knee Surgery

Journal IEEE Computer Graphics and Applications

Proceedings of the Institution of Mechanical Engineers, Part K, Journal of Multi-body Dynamics

Conference Reviewer

American Society of Mechanical Engineers Summer Bioengineering Conference

Pacific Symposium on Biocomputing, Multiscale Modeling and Simulation Session

1<sup>st</sup> International Conference on Applied Bionics and Biomechanics (ICABB)

2008 IEEE Region 5 Technical, Professional, and Student Conference

Conference Session Moderator

Chair, Human Dynamics, American Society of Mechanical Engineers Summer Bioengineering Conference, June 2013

Co-Chair, Multiscale Biomechanics: Bridging from the Body/Organ to the Tissue/Cell/Microstructural level, Special Session, Computer Methods in Biomechanics and Biomedical Engineering 11<sup>th</sup> International Symposium, April 2013

Co-Chair, Multiscale Modeling, Computer Methods in Biomechanics and Biomedical Engineering 11<sup>th</sup> International Symposium, April 2013

Co-Chair, Undergraduate Design Competition in Rehabilitation Assistive Devices Session, American Society of Mechanical Engineers Summer Bioengineering Conference, June 2011

Chair, Orthopaedic Design Session, American Society of Mechanical Engineers Summer Bioengineering Conference, June 2009

Chair, Robotic Joint Motion for Simulation and Rehabilitation Session, American Society of Mechanical Engineers Summer Bioengineering Conference, June 2008

Chair, Nanomedicine and Life Sciences Session, Missouri Nanotechnology Alliance Second Annual Meeting, November 11-12, 2005

Panel Member, University of Missouri Postdoctoral Association, Academic Job Search Workshop, February 2016

Panel Member, Research and Grant Writing, New Faculty Orientation, August 2009, New Faculty Teaching Scholars Program, May 2009

Judge, ORS Meniscus Section Awards

Judge, Grand Challenge to Predict Knee Loading

Judge, Student Poster Competition (B.S., Ph.D.), American Society of Mechanical Engineers Summer Bioengineering Conference

Judge, University of Missouri Health Sciences Research Day

Judge, Kansas City Science Fair

## Publications

### Journal Articles:

Complete List of Published Work in MyBibliography:

<http://www.ncbi.nlm.nih.gov/sites/myncbi/trent.guess.1/bibliography/48713434/public/>

Razu S, **Guess T.M.**, (2017) EMG-driven Forward Dynamics Simulation to Estimate in Vivo Joint Contact Forces During Normal, Smooth, and Bouncy Gait. *Journal of biomechanical engineering*. doi: 10.1115/1.4038507. PubMed PMID: 29164228. [Epub ahead of print].

Thompson, S.F, **Guess, T.M.**, Plackis, A.C., Sherman, S.L., Gray, A.D., (2017). "Youth Baseball Pitching Mechanics: A Systematic Review", *Sports Health*, doi: 10.1177/1941738117738189. PubMed PMID: 29090988. [Epub ahead of print].

**Guess, T.M.**, Razu, S., Kuroki, K. Cook, J.L., (2017). "Function of the Anterior Intermeniscal Ligament", *Journal of Knee Surgery*, doi: 10.1055/s-0037-1600089. PubMed PMID: 28355680. [Epub ahead of print].

Gray AD, Willis BW, Skubic M, Huo Z, Razu S, Sherman SL, **Guess TM**, Jahandar A, Gulbrandsen TR, Miller S, Siesener NJ. (2017) Development and Validation of a Portable and Inexpensive Tool to Measure the Drop Vertical Jump Using the Microsoft Kinect V2. *Sports health*. 2017;9(6):537-44. doi: 10.1177/1941738117726323. PubMed PMID: 28846505. [Epub ahead of print].

Willis, B.W., Razu S., Baggett K., Jahandar A., Gray, A.D., Skubic M., Sherman, S.L., Blecha K., **Guess, T.M.**, (2017). "Sex Differences in Frontal and Transverse Plane Hip and Knee Kinematics During the Modified Star Excursion Balance Test." *Human Movement*, 18(3): 26-33.

**Guess, T. M.**, S. Razu, A. Jahandar, M. Skubic and Z. Huo (2017). "Comparison of 3D Joint Angles Measured With the Kinect 2.0 Skeletal Tracker Versus a Marker-Based Motion Capture System." *Journal of Applied Biomechanics*, 33(2): 176-181. doi: 10.1123/jab.2016-0107. PubMed PMID: 27918704.

- Guess, T.M.**, Razu, S., (2017). "Loading of the medial meniscus in the ACL deficient knee: A multibody computational study", *Medical engineering & physics*, 2017;41:26-34. doi: 10.1016/j.medengphy.2016.12.006. PubMed PMID: 28089224; PMCID: PMC5316296.
- Erdemir, A., **Guess, T.M.**, Halloran, J.P., Modenese, L., Reinbolt, J.A., Thelen, D.G., Umberger, B.R., (2016). "Commentary on the Integration of Model Sharing and Reproducibility Analysis to Scholarly Publishing Workflow in Computational Biomechanics", *IEEE Transactions on Biomedical Engineering*, 63(10): 2080-2085.
- Guess, T. M.**, Razu, S., Jahandar, H., (2016). "Evaluation of Knee Ligament Mechanics Using Computational Models", *Journal of Knee Surgery*, 29(02): 126-137.
- Guess, T. M.**, Razu, S., Jahandar, H., Stylianou, A., (2015). "Predicted Loading on the Menisci during Gait: The Effect of Horn Laxity", *Journal of Biomechanics*, 48(8): 1490-1498.
- Rahman, M., Cil, A., Johnson, M., Lu, Y., **Guess, T. M.**, (2014). "Development and Validation of a Computational Multibody Model of the Elbow Joint", *Journal of Advances in Biomechanics & Applications*, 1(3):169-185.
- Guess, T. M.**, Stylianou, A. P., and Kia, M., (2014). "Concurrent Prediction of Muscle and Tibiofemoral Contact Forces During Treadmill Gait.", *Journal of Biomechanical Engineering*, 136(2): 021032-1-021032-9.
- Kia, M., Stylianou, A. P., and **Guess, T. M.**, (2014). "Evaluation of a Musculoskeletal Model with Prosthetic Knee through Six Experimental Gait Trials.", *Medical Engineering & Physics*, 36(3): 335-344.
- Stylianou, A. P., **Guess, T. M.**, and Cook, J. L. (2014). "Development and Validation of a Multibody Model of the Canine Stifle Joint", *Computer Methods in Biomechanics and Biomedical Engineering*, 17(4): 370-377.
- Lu, Y., Derakhshani, R., Pulasani, P. R., **Guess, T. M.** (2013). "Application of Neural Networks for the Predication of Cartilage Stress in a Musculoskeletal System.", *Biomedical Signal Processing and Control*, 8(6): 475-482.
- Stylianou, A. P., **Guess, T. M.**, and Kia, M. (2013), "Multibody Muscle Driven Model of an Instrumented Prosthetic Knee During Squat and Toe Rise Motions." *Journal of Biomechanical Engineering*, 135(4), 041008.
- Guess, T. M.**, Liu, H., Bhashyam, S., Thiagarajan, G. (2013). "A Multibody Knee Model with Discrete Cartilage Prediction of Tibio-Femoral Contact Mechanics." *Computer Methods in Biomechanics and Biomedical Engineering*, 16(3): 256-270.
- Guess, T. M.** (2012) "Forward dynamics simulation using a natural knee with menisci in the multibody framework", *Multibody System Dynamics*, 28(1): 37-53.
- Bloemker, K. H., **Guess, T. M.**, Maletsky, L. P., Dodd, K., (2012). "Computational Knee Ligament Modeling Using Experimentally Determined Zero-Load Lengths", *Open Biomed Eng J*, vol. 6, pp. 33-41.
- Jacobsen, R., **Guess, T. M.**, Burks, A. (2012). "Comparing activation and recoil forces generated by epinephrine autoinjectors and their training devices" *J Allergy Clin Immunol.*, Apr;129(4):1143-1145.
- Guess, T. M** and A. P. Stylianou, (2012) "Simulation of Anterior Cruciate Ligament Deficiency in a Musculoskeletal Model with Anatomical Knees", *Open Biomed Eng J*, vol. 6, pp. 23-32.
- A. Erdemir, **T. M. Guess**, J. Halloran, S. C. Tadepalli, and T. M. Morrison, (2012) "Considerations for reporting finite element analysis studies in biomechanics," *J Biomech*, vol. 45, pp. 625-633.
- Mishra, M., Derakhshani, R., Paiva, G., **Guess, T. M.** (2011). "Nonlinear surrogate modeling of tibio-femoral joint interactions," *Biomedical Signal Processing and Control*, vol. 6, pp. 164-174.

**Guess, T. M.**, Thiagarajan, G., Kia, M. and Mishra, M. (2010). "A subject specific multibody model of the knee with menisci." *Med Eng Phys*, 32, 5 (Jun 2010), 505-515.

Tawhai M, Bischoff J, Einstein D, Erdemir A, **Guess T** and Reinbolt J. (2009). "Multiscale Modeling in Computational Biomechanics." *IEEE Eng Med Biol Mag*, 28:41-49.

**Guess, T. M.** and L. P. Maletsky (2005). "Computational modelling of a total knee prosthetic loaded in a dynamic knee simulator." *Medical Engineering & Physics* 27(5): 357-367.

**Guess, T. M.** and L. P. Maletsky (2005). "Computational Modeling of a Dynamic Knee Simulator for Reproduction of Knee Loading." *Journal of Biomechanical Engineering* 127(7): 1216-1221.

#### Peer – Reviewed Conference Proceedings:

**Guess, T.**, Hocker, K., Gray, A., Razu, S., Kurkowski, S., Sherman, S., Skubic, M., Willis, B., "The Medial Knee Position at Initial Contact of the Drop Vertical Jump is Strongly Correlated to the Knee Abduction Angle", APTA Combined Sections Meeting, New Orleans, LA, February 2017

Echelmeyer, D., Willis, B.W., Guess, M., Sherman, S.L., Gray, A.G. Blecha, K., **Guess, T.M.**, "Comparing Peak Hip and Knee Flexion during the Lateral Step Down Test between the Kinect V2 and Vicon: Examining Subjects with and without ACL-Reconstruction.", APTA Combined Sections Meeting, New Orleans, LA, February 2017

Razu, S., **Guess, T.M.**, "Multi-Scale Model in Co-Simulation to Estimate Patellofemoral Contact Stress in Total Knee Replacement", Proceedings of the 41st Annual Meeting of the American Society of Biomechanics, Boulder, CO, August 2017

Martinez, R., Abbott, C., Prost, E., Razu, S., **Guess, T.**, "Study of Walking Effort on Elder Patients with and without the use of Walking Poles", Orthopaedic Research Society Midwest Musculoskeletal Workshop, St. Louis, MO, July 2017

Muller, J., Razu, S., **Guess, T.**, "Translating Patella Tendon Properties from the Open Knee in-vitro Dataset to a Computational Model", Orthopaedic Research Society Midwest Musculoskeletal Workshop, St. Louis, MO, July 2017

Jahandar, A., Razu, S., Sherman, S., **Guess, T.**, "Sensitivity of Patellofemoral Contact to the MPFL Ligament", Orthopaedic Research Society Midwest Musculoskeletal Workshop, St. Louis, MO, July 2017

Larson, M., Mann, B., Jahandar, A., **Guess, T.**, Mayhew, J., "Comparison of Reactive Strength Index Modified With and Without Arm Swing in Athletes", 2017 National Strength and Conditioning Association (NSCA) National Conference, Las Vegas, NV, July 2017.

Larson, M., Mann, B., Ahmad, O., Burney, R., **Guess, T.**, Jahandar, A., Razu, S., Mayhew, J., "Comparison of Static and Countermovement Push-ups in Male and Female Throwers: An Exploratory Study", 2017 National Strength and Conditioning Association (NSCA) National Conference, Las Vegas, NV, July 2017.

Mann, B., Bird, S., Cutchlow, R., Jahandar, A., **Guess, T.**, Mayhew, J., "Reliability of the Components of Dynamic Strength Deficit in NCAA Division-I College Baseball Players", 2017 National Strength and Conditioning Association (NSCA) National Conference, Las Vegas, NV, July 2017.

Davis, D., Mann, B., Razu, S., Bean, K., **Guess, T.**, "Lower Extremity Joint Kinematics: Evaluating the Differences Between Countermovement Jump Types", Irish Journal of Medical Science, 186, S37, January 2017

Sherman, S.L., Gray, A., Willis, B., Huo, Z., Siesner, N., Gulbrandsen, T., Miller, S., Razu, S., Jahandar, A., Skubic, M., **Guess, T.M.**, "Development and Validation of a Portable and Inexpensive ACL Injury Risk Identification Tool: Measuring the Drop Vertical Jump Using the Microsoft Kinect V2", 11<sup>th</sup> Biennial International Society, of Arthroscopy, Knee Surgery, and Orthopaedic Medicine Congress, Shanghai, China, June 2017

Razu, S., **Guess, T.M.**, "Estimation of Tibiofemoral Contact Force using Muscle Synergies", Orthopaedic Research Society 2017 Annual Meeting, San Diego, California, March 2017

Razu, S., Sherman, S.L., **Guess, T.M.**, "The Effect of Sulcus Angle and Tubercle Lateralization on Patellofemoral Contact Pressures during Gait: a Computational Study", Orthopaedic Research Society 2017 Annual Meeting, San Diego, California, March 2017

Martinez C., R., Abbott, C., Prost, E., Razu, S., **Guess, T.M.**, "Effect of Walking Poles on Trunk, Pelvic and Knee Kinematics in Older Adults", Orthopaedic Research Society 2017 Annual Meeting, San Diego, California, March 2017

Davis L, Willis B, Gray A, Sherman S, Razu S, Jahandar A, Skubic M, Blecha K, **Guess T.**, "Simplifying Anterior Cruciate Ligament Injury Screening: A Jump in the Right Direction." American Physical Therapy Association Combined Sections Meeting, San Antonio, TX. February, 2017.

Davis, L. M., B. W. Willis, A. Gray, S. Sherman, S. Razu, A. Jahandar, M. Skubic, K. Blecha and **T. M. Guess** (2017). "Simplifying Anterior Cruciate Ligament Injury Screening: A Jump In The Right Direction." *Journal of Orthopaedic & Sports Physical* 47(1): A176-A177.

Prost, E.L., Abbott, C., Willis, B.W., Williams, H., Flowers, P., Razu, S., Martinez Campuzano, R., Jahandar, A., **Guess, T. M.**, "Using Walking Poles Results In Slower Gait Parameters For Community Dwelling Older Adults", 26th Annual Caring for the Frail Elderly Conference, Columbia, MO, August 2016.

Flowers, P., **Guess, T.M.**, "Knee Sagittal Angle and Ground Reaction Forces During Step Up Task in Knee Osteoarthritis Population Compared to Healthy Controls", Proceedings of the 40<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Raleigh, NC, August 2016

Sherman, S.L., Gulbrandsen, T.R., Miller, S.M., **Guess, T.M.**, Willis, B.W., Blecha, K.M., Huo, Z., Skubic, M., Gray, A.D., "Mass Screening of Youth Athletes for High Risk Landing Patterns using a Portable and Inexpensive Motion Sensor Device", American Orthopaedic Society for Sports Medicine Annual Meeting, Colorado Springs, July 2016

Sherman, S. L., Gulbrandsen, T. R., Miller, S. M., **Guess, T.**, Willis, B. W., Blecha, K. M., Hou, Z., Skubic, M., Gray, A. D. (2016). Mass Screening of Youth Athletes for High Risk Landing Patterns using a Portable and Inexpensive Motion Sensor Device. *Orthopaedic Journal of Sports Medicine*, 4(7 suppl4), 2325967116S00120. <http://doi.org/10.1177/2325967116S00120>

Razu, S., Bean, K.T., Jahandar, A., **Guess, T.M.**, "Gender Differences Between SCoRE and Regression Methods for Locating Hip Joint Center", Gait and Clinical Movement Analysis Society 2016 Annual Conference, Memphis, TN, May 2016

Flowers, P., **Guess, T.M.**, "Ground Reaction Forces During Step Down Task in Knee Osteoarthritis Population Compared to Healthy Controls", Gait and Clinical Movement Analysis Society 2016 Annual Conference, Memphis, TN, May 2016

Razu, S., Bean, K.T., Jahandar, A., **Guess, T.M.**, "Comparison of Three Methods to Estimate the Axis of Rotation for the Knee", Gait and Clinical Movement Analysis Society 2016 Annual Conference, Memphis, TN, May 2016

Willis, B.W., Razu, S., Jahandar, A., Gray, A., Skubic, M., Sherman, S., Blecha, K., **Guess, T.M.**, "Gender Differences During the Modified Star Excursion Balance Test", Gait and Clinical Movement Analysis Society 2016 Annual Conference, Memphis, TN, May 2016

Razu, S., Bean, K.T., Jahandar, A., **Guess, T.M.**, "Kinematic Comparisons of Three Plug-in Gait Variation Protocols in Gait Analysis", Gait and Clinical Movement Analysis Society 2016 Annual Conference, Memphis, TN, May 2016

Sloan, M., Flowers, P., **Guess, T.M.**, “Ground Reaction Forces in Healthy and Knee Osteoarthritis Populations”, Gait and Clinical Movement Analysis Society 2016 Annual Conference, Memphis, TN, May 2016

**Guess, T.M.**, Razu, S., Jahandar, H., “Biomechanical Function of the Anterior Intermeniscal Ligament”, Orthopaedic Research Society 2016 Annual Meeting, Orlando, Florida, March 2016

**Guess, T.M.**, Razu, S., “Function of the Deep Medial Collateral Ligament Meniscal Attachments in the ACL Deficient Knee”, Orthopaedic Research Society 2016 Annual Meeting, Orlando, Florida, March 2016

Jahandar, A., Razu, S., Jahandar, H., Nuelle, C., Sherman, S.L., **Guess, T.M.**, “Biomechanical Analysis Of The Anterolateral Ligament (ALL) Using an in vivo Musculoskeletal Model”, Orthopaedic Research Society 2016 Annual Meeting, Orlando, Florida, March 2016

**Guess, T.M.**, Razu, S., Jahandar, H., “Effect of Deep Medial Collateral Ligaments on Meniscus Motion”, Proceedings of the 39<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Columbus, Ohio, August 2015

Razu, S., Mann, J. B., **Guess, T.M.**, “Estimating Vertical and Long Jump Power in Female Collegiate Soccer Athletes”, Proceedings of the 39<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Columbus, Ohio, August 2015

Flowers, P., **Guess, T.M.**, “Ground Reaction Force Comparison of Prediction-Based and Direct Measurement Systems”, Proceedings of the 39<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Columbus, Ohio, August 2015

Razu, S., Jahandar, A., **Guess, T.M.**, “Comparative Evaluation of the Microsoft Kinect with the Vicon Motion Capture System to Obtain 3D Knee Angles”, Proceedings of the 39<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Columbus, Ohio, August 2015

Bean, K., Mann, J. B., **Guess, T.M.**, “Lower Body Joint Kinetics in Standing Broad, Vertical, and Squat Jumps”, Proceedings of the 39<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Columbus, Ohio, August 2015

Flowers, P., Razu, S., Bean, K., **Guess, T.M.**, “Kinematic Comparison of Marker-Based and Markerless Motion Capture Systems”, Proceedings of the 39<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Columbus, Ohio, August 2015

Jahandar, H., Razu, S. S., Sherman, S. L., **Guess, T. M.**, “Predicting Patellofemoral Contact Mechanics: a Computational Study”, Proceedings of the 39<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Columbus, Ohio, August 2015

Razu, S., **Guess, T.M.**, “Comparison of Three Plug-in-gait Protocol Variations in Gait Analysis, Proceedings of the 39<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Columbus, Ohio, August 2015

Wilson, S., Hausselle, J., **Guess, T.**, Gonzalez, R., “Improved Contact and Meniscus Properties in Multibody Dynamics Modeling of the Knee”, XXV Congress of the International Society of Biomechanics, Glasgow, Scotland, UK, July 2015

Sherman, S. L., Razu, S. S., Jahandar, H., **Guess, T. M.**, “Knee cAPP: A Musculoskeletal Model Used to Predict Changes in Patellofemoral Contact Pressures During Gait”, ICERS 2015 - 12th World Congress of the International Cartilage Repair Society, Chicago, IL, May 2015

Stylianou, A., Razu, S., Jahandar, H., Bloemker, K. H., Cil, A., **Guess, T. M.**, “Ligament Resting Length: A Method for Patient Specific Determination.” Orthopaedic Research Society 2015 Annual Meeting, Las Vegas, Nevada, March 2015

**Guess, T.M.**, Stylianou, A., Razu, S., Jahandar, H., “Computational Musculoskeletal Modeling in Movement Analysis”, APTA Combined Sections Meeting, Indianapolis, IN, February 2015

**Guess, T.M.**, Stylianou, A., Jahandar, H., “Concurrent Prediction of Knee Contact, Ground Reaction, and Muscle Forces During Gait”, Proceedings of the 7<sup>th</sup> World Congress of Biomechanics, Boston, Massachusetts, July 2014

Wilson, S.P., Hausselle, J., **Guess, T.M.**, Gonzalez, R.V., “Improved Multibody Modeling of Human Knee Meniscus: First-Estimate Design Techniques and Experimental Verification”, Proceedings of the 7<sup>th</sup> World Congress of Biomechanics, Boston, Massachusetts, July 2014

Rahman, M., **Guess, T.M.**, Johnson, M., Cil, A., “Development and Validation of a Computational Multibody Model of the Elbow Joint”, Proceedings of the 37<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Omaha, Nebraska, September 2013

Stylianou, A., **Guess, T.**, Kia, M., “Tibio-Femoral Contact Pressure During Gait”, Proceedings of the ASME 2013 Summer Bioengineering Conference, Sunriver, Oregon, June 2013

Kia, M., **Guess, T.**, Stylianou, A., “Musculoskeletal Model During treadmill Gait”, Proceedings of the ASME 2013 Summer Bioengineering Conference, Sunriver, Oregon, June 2013

**Guess, T.**, Stylianou, A., Kia, M., Lu, Y., Derakhshani, R., Pulasani, P., “Concurrent Simulation of Muscle Force and Tissue Stress During Movement: Multiscale Modeling From the Body to Tissue Levels”, Proceedings of the 11<sup>th</sup> International Symposium, Computer Methods in Biomechanics and Biomedical Engineering, Salt Lake City, Utah, April 2013, Presented in the Special Session: Multiscale Biomechanics: Bridging from the Body/Organ level to the Tissue/Cell/Microstructure level.

Zhu, F., **Guess, T.**, Kia, M., “Computational Modeling to Represent Shoe Behavior in Multibody Movement Simulations”, Orthopaedic Research Society 2013 Annual Meeting, San Antonio, Texas, January 2013

Stylianou, A., **Guess, T.**, Kia, M., “Contact Pressure Estimation in a Muscle Driven Model of an Instrumented Prosthetic Knee during Gait”, Orthopaedic Research Society 2013 Annual Meeting, San Antonio, Texas, January 2013

Kia, M., **Guess, T.**, Stylianou, A., “Validation of a Musculoskeletal Model with Prosthetic Knee through Six Experimental Gait Trials”, Orthopaedic Research Society 2013 Annual Meeting, San Antonio, Texas, January 2013

Bloemker, K., Kia, M., **Guess, T.**, “Prediction of Knee Loading During a Dual-Limb Squat in a Muscle-Driven Musculoskeletal Model with Anatomic Knee Joints”, Orthopaedic Research Society 2013 Annual Meeting, San Antonio, Texas, January 2013

Kia, M., Bloemker, K., **Guess, T.**, Cil, A., “A Combined Computational and Experimental Approach to Measure the Ligament Resting Length”, Orthopaedic Research Society 2013 Annual Meeting, San Antonio, Texas, January 2013

Paiva, Gavin, Sampath Bhashyam, Ganesh Thiagarajan, Reza Derakhshani, and **Trent Guess**, (2012). “A Data-driven Surrogate Model to Connect Scales between Multi-domain Biomechanics Simulations”, Conf Proc IEEE Eng Med Biol Soc, San Diego, CA., pages: 3077-80, August 2012

**Guess, Trent M.**, Antonis Stylianou, and Mohammad Kia, “Validation of Knee Load Predictions During a Dual Limb Squat and Calfrise”, Proceedings of the ASME 2012 Summer Bioengineering Conference, Fajardo, Puerto Rico, June 2012

Kia, Mohammad, **Guess, Trent M.**, and Antonis Stylianou, “Musculoskeletal Model of the Human Knee with Representation of Menisci During the Stance Phase of a Walk Cycle”, Proceedings of the ASME 2012 Summer Bioengineering Conference, Fajardo, Puerto Rico, June 2012

**Guess, T. M.**, “Forward Dynamics Movement Simulation with Anatomical Representation of the Knee”, 10<sup>th</sup> International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, Berlin, Germany, April 2012.

Stylianou, A. P., **Guess, T. M.**, Cook, J. L., “Multibody Modeling of the Canine Cranial Cruciate Ligament Deficient Stifle Joint”, 2012 Veterinary Orthopedic Society Meeting, Crested Butte, Colorado, March 2012

Jacobsen, Ryan C., **Trent M. Guess**, and Wesley A. Burks, “Comparing Activation and Recoil Forces Generated by Epinephrine Autoinjectors and their Training Devices”, American Academy of Allergy, Asthma and Immunology (AAAAI) Annual Conference, Orlando, Florida, March 2012.

Bloemker, Katherine H., and **Trent M. Guess**, “Effects of ACL Reconstruction Techniques on the Kinematics of the Knee in a Computational Knee Model”, Proceedings of the ASME 2011 Summer Bioengineering Conference, Farmington, Pennsylvania, June 2011

Kia, Mohammad, and **Trent M. Guess**, “A Musculoskeletal Model with Prosthetic Knee During a Walk Cycle”, Proceedings of the ASME 2011 Summer Bioengineering Conference, Farmington, Pennsylvania, June 2011

Stylianou, Antonis, **Trent M. Guess**, Leo Olcott, Gavin Paiva, Mohammad Kia, James Cook, “A Model of the Canine Stifle Joint with Representation of Medial Meniscus During Squat Motion”, Proceedings of the ASME 2011 Summer Bioengineering Conference, Farmington, Pennsylvania, June 2011

Paiva, Gavin, and **Trent M. Guess**, “Development of Generalized Parameters for Canine Multibody Meniscus Models From Experimental Data”, Proceedings of the ASME 2011 Summer Bioengineering Conference, Farmington, Pennsylvania, June 2011

**Trent M. Guess**, “Forward Dynamics Simulation using a Natural Knee with Menisci in the Multibody Framework”, EUROMECH Colloquium 511 on Biomechanics of Human Motion. J Ambrosio et. al. (eds.), Ponta Delgada, Azores, Portugal, March, 2011

Paiva, Gavin, **Trent M. Guess**, Mohammad Kia, “Generating Parameters of a Multi-body Meniscus Model From Experimental Data”, Proceedings of the ASME 2010 Summer Bioengineering Conference, Naples, Florida, June 2010

Kia, Mohammad, **Trent M. Guess**, Gavin C. Paiva, “The Study of Menisci Effect on Tibio-Femoral Kinematics In a Computational Knee Joint”, Proceedings of the American Society of Biomechanics Annual Meeting, Penn State, Pennsylvania, August 2009

Kia, Mohammad, **Trent M. Guess**, Meenakshi Mishra, Ganesh Thiagarajan, “Use of Design of Experiment Approach to Predict Force-Displacement Relationship for the Subject-Specific Model of Lateral Meniscus”, Proceedings of the American Society of Biomechanics Annual Meeting, Penn State, Pennsylvania, August 2009

Kia, Mohammad and **Trent M. Guess**, “Use of Design of Experiment Approach to Predict Force-Displacement Relationship for the Knee Joint and Menisci in a Multi-body Dynamic Knee Model”, Proceedings of the ASME 2009 Summer Bioengineering Conference, Lake Tahoe, California, June 2009

**Guess, Trent M.**, Mohammad Kia, Katherine Weimer, Kevin Dodd, and Lorin Maletsky, “Validation of Computational Knee Models Using a Dynamic Knee Simulator”, Proceedings of the ASME 2008 Summer Bioengineering Conference, Marco Island, Florida, June 2008

Kia, Mohammad and **Trent M. Guess**, “Multi-body Dynamic Simulation of the Meniscus in a Computational Knee Model”, Proceedings of the ASME 2008 Summer Bioengineering Conference, Marco Island, Florida, June 2008

Maletsky, Lorin P., Chadd W. Clary, **Trent M. Guess**, Amit M. Mane, Amber N. Reeve, “In Vitro Simulation of Deep Knee Flexion Using Static and Dynamic Machines”, Proceedings of the ASME 2008 Summer Bioengineering Conference, Marco Island, Florida, June 2008

Sherwood, Jesse, Reza Derakhshani, **Trent Guess**, “A Comparative Study of Linear and Nonlinear Data-Driven Surrogate Models of Human Joints”, Proceedings of the 2008 IEEE Region 5 Technical, Professional, and Student Conference, April 2008

Kia, Mohammad and **Trent M. Guess**, “The Study of Menisci Effect in a Computational Knee Model”, Proceedings of the 6<sup>th</sup> Combined Meeting of the Orthopaedic Research Societies, Honolulu, Hawaii, October 2007

Weimer, Katherine A., **Trent M. Guess**, Kevin A. Dodd, and Lorin P. Maletsky, “Development and Validation of a Subject-Specific Computational Human Knee Model in a Dynamic Knee Simulator Including Quadriceps Tendon and MCL Wrapping”, Proceedings of the 6<sup>th</sup> Combined Meeting of the Orthopaedic Research Societies, Honolulu, Hawaii, October 2007

Weimer, Katherine A., **Trent M. Guess**, Kevin A. Dodd, and Lorin P. Maletsky, “Development and Validation of a Subject-Specific Computational Human Knee Model in a Dynamic Knee Simulator”, Proceedings of the 2007 Summer Bioengineering Conference, Keystone, Colorado, June 2007

Shankar, Aarthi, and **Trent M. Guess**, “Optimization of Quadriceps Force Distribution for Minimization of Patellofemoral Contact Pressure During a Squat”, Proceedings of the 2007 Summer Bioengineering Conference, Keystone, Colorado, June 2007

Lenz, Nathaniel, Nicholas A Morton, Lorin P Maletsky, and **Trent M. Guess**, “Development Of A Cutting Maneuver To Generate A Realistic ACL Injury In Vitro”, Proceedings of the 2006 Summer Bioengineering Conference, Amelia Island, Florida, June 2006

Rayaprolu, Jyothi and **Guess, Trent**, “A 3-D Dynamic Model Of The Knee Joint Capable Of Controlling Quadriceps Forces Based On Predicted Retropatellar Stresses”, Proceedings of the 2005 ASME Summer Bioengineering Conference, Wayne, J. ed., Vail, Colorado, June 2005

**Guess, T. M.**, and L.P. Maletsky. “Computational Modeling of a Dynamic Knee Simulator for Reproduction of Knee Loading”, ASME 2003 International Mechanical Engineering Congress & Exposition, Washington D.C., November, 2003

**Guess, T. M.**, and L. P. Maletsky. “Computational Modeling of a Dynamic Knee Simulator for Prediction of Knee Loading”, ASME 2003 Summer Bioengineering Conference, Soslowsky, L. J. ed., Key Biscayne, Florida, 859-860.

**Guess, T.**, and D. Alciatore, "Model Development and Control Implementation for a Magnetic Levitation Apparatus", Proceedings of the 1995 ASME International Computers in Engineering Conference, Boston, September, 1995

#### **Presentations and Posters:**

Razu, S., Nettrour, J., **Guess, T.M.**, “Multi-scale Model in Embedded Simulation to Estimate Patellofemoral Contact Stress in Total Knee Arthroplasty”, University of Missouri Health Sciences Research Day, November 9, 2017, Columbia, MO.

**Trent M. Guess**, “*How do you rupture an ACL? The forces acting on knee tissue during movement*”, Saturday Morning Science Lectures Series, November 4, 2017, Columbia, MO.

Razu, S., **Guess, T. M.**, “Unraveling Knee Loading during Movement”, Comparative Orthopaedics Day, April 2017, Columbia, MO.

**Trent M. Guess**, “Musculoskeletal Biomechanics in Orthopaedic Research”, University of Missouri Grand Rounds, August 2016.

Seth Sherman, **Trent Guess**, Brad Willis, Aaron Gray, Marjorie Skubic, Kyle Blecha, “Mass Screening of Youth Athletes for High Risk Landing Patterns Using a Portable and Inexpensive Motion Sensor Device: Efficiency, Gender Disparities and Continued Validity of the Xbox Kinect for Assessing ACL Injury Risk”, ACL Study Group, Are, Sweden, March 2016.

Flowers, P., **Guess, T. M.**, “Interlimb differences in ground reaction forces during step-up and step-down tasks in a knee osteoarthritis population”, Comparative Orthopaedics Day, April 2016, Columbia, MO.

Trevor Gulbrandsen, Aaron Gray, **Trent Guess**, Marjorie Skubic, Seth Sherman, "Screening Youth Athletes for High Risk Landing Patterns using an Inexpensive and Portable Motion Sensor Device", University of Missouri Health Sciences Research Day, November 2015.

Nathan Siesener, Pat Smith, **Trent Guess**, Aaron Gray, Kyle Blecha, Seth Sherman, "Correlating Motion Analysis Systems and Clinical Testing to Establish an Appropriate Return to Sport Protocol Following ACL Reconstruction in Athletes", University of Missouri Health Sciences Research Day, November 2015.

Morgan Sloan, Portia Flowers, **Trent M. Guess**, Vertical Ground Reaction Forces in the Healthy and Knee Osteoarthritis Populations", University of Missouri Health Sciences Research Day, November 2015.

Portia Flowers, Swithin Razu, Kaylin Bean, **Trent M. Guess**, "Kinematic Comparison of Marker-based and Markerless Motion Capture Systems", University of Missouri Health Sciences Research Day, November 2015.

Portia Flowers, **Trent M. Guess**, "Sagittal Knee Angles in Healthy and Knee Osteoarthritis Populations", University of Missouri Health Sciences Research Day, November 2015.

Amirhossein Jahandar, Seth L. Sherman, **Trent M. Guess**, "Biomechanical Analysis of the Anterolateral Ligament (ALL) Using an In Vivo Musculoskeletal Model", University of Missouri Health Sciences Research Day, November 2015.

Swithin S. Razu, **Trent M. Guess**, "Comparative Evaluation of the Microsoft Kinect with the VICON Motion Capture System to Obtain 3D Hip and Knee Angles", University of Missouri Health Sciences Research Day, November 2015.

Swithin S. Razu, **Trent M. Guess**, Simulating the Effect of Sulcus Angle on Patellofemoral Contact Pressures During Gait", University of Missouri Health Sciences Research Day, November 2015.

Sherman, S. L., Razu, S. S., Jahandar, H., **Guess, T. M.**, "Knee cAPP: A Musculoskeletal Model Used to Predict Changes in Patellofemoral Contact Pressures During Gait", 2015 meeting of the International Patellofemoral Study Group (IPSG), Chicago, IL, September 2015

**Guess, T. M.**, "Vicon Vs DARI Vs Kinect", Comparative Orthopaedics Day, April 2015, Columbia, MO.

Jahandar, H., Mann, B., **Guess, T. M.**, "Validity of the Mad Maxx Power Reading for Firing Out of the Positional Stance for American Football Players", Scientific Program of the 2014 NSCA National Conference in Las Vegas, Nevada. July 2014, Las Vegas, NV.

**Guess, T. M.**, "Movement Simulation and Joint Loading", Comparative Orthopaedics Day, April 2014, Columbia, MO.

**Guess, T. M.**, "Simulation and Measurement of Human Motion for Prediction of Joint Loading", Food for the Twenty-First Century Bioprocessing and Biosensing Center, Spring 2013 Seminar Series, January 2014, Columbia, MO.

**Guess, T. M.**, "Musculoskeletal Modeling for Orthopaedic Disorders", Comparative Orthopaedics Day, April 2012, Columbia, MO.

**Guess, T. M.**, "Forward dynamics movement simulation with anatomical representation of the knee", University of Missouri Mechanical Engineering Graduate Seminar, March 2012, Columbia, MO.

**Guess, T. M.**, "Concurrent Prediction of Muscle Force and Cartilage Stress during Movement", RPI-NSF Workshop on Multiscale Modeling of Complex Data, September 2011, Troy, NY.

**Guess, T. M.**, "Prediction of Tibio-Menisco-Femoral Loading During Movement", Comparative Orthopaedics Day, April 2011, Columbia, MO.

Stylianou, A., **Guess, T. M.**, "Validation of a Subject Specific Canine Stifle Joint Model", Comparative Orthopaedics Day, April 2011, Columbia, MO.

**Guess, T. M.**, "Data-driven Surrogates in Multiscale Musculoskeletal Modeling", Interagency Modeling and Analysis Group Multiscale Modeling Consortium Meeting, October 2010 Bethesda, MD.

**Guess TM**, Paiva G, Olcott L, Kia M, "Musculoskeletal Modeling of the Canine Hind Limb", Comparative Orthopaedics Day, April 2010, Columbia, MO.

Paiva G, Olcott L, **Guess TM**, Kia M, "Multibody Modeling of the Canine Stifle", Comparative Orthopaedics Day, April 2010, Columbia, MO.

**Trent Guess**, Reza Derakhshani, Greg King, Daniel Leon-Salas, "Multi-disciplinary Collaborations in Measurement of Human Motion", Missouri Regional Life Sciences Summit, March 2010, Kansas City, MO

**Trent Guess**, James L Cook, "Clinical and Computational Collaboration in Orthopaedics Biomechanics", Missouri Regional Life Sciences Summit, March 2010, Kansas City, MO

Ganesh Thiagarajan, **Trent Guess**, Himabindu Bodduna, Meenakshi Mishra "Finite Element Modeling of Patient Specific Human Knee Joints", Proceedings of the 2009 NSF Engineering Research and Innovation Conference, Honolulu, Hawaii, June 2009

**Trent M. Guess** "Computational Modeling of Tibio-menisco-femoral Mechanical Interactions within a Multibody Framework", Comparative Orthopaedics Day, April 2009, Columbia, MO.

**Trent M. Guess** "Dynamic Simulation of Joints using Multiscale Modeling", SIAM Conference on the Life Sciences, August 2008, Montreal, Quebec, Canada

**Trent M. Guess**, Mohammad Kia, Reza Derakhshani, Jesse Sherwood, Ganesh Thiagarajan "Multiscale Simulation of the Musculoskeletal System using Surrogate Models of Tissue Behavior", SIAM Conference on the Life Sciences, August 2008, Montreal, Quebec, Canada

Anil Misra, Viraj Sing, **Trent Guess**, "Microstructure and Composition Based Constitutive Relationships for Meniscus/Cartilage", SIAM Conference on the Life Sciences, August 2008, Montreal, Quebec, Canada

Joy P. Ku, Randy Radmer, Jeanette Schmidt, Russ Altman, Scott Delp, **Trent Guess**, "Simtk.org: Using Technology to Encourage the Sharing of Research Tools and Data", SIAM Conference on the Life Sciences, August 2008, Montreal, Quebec, Canada

**Trent M. Guess** "Working Towards a Virtual Physiological Human: Modeling the Joints", American Society of Mechanical Engineers – Kansas City Section, September 2007

**Trent M. Guess** "Dynamic Simulation of Joints Using Multiscale Modeling" 2007 Multiscale Modeling PI Consortium Meeting, Bethesda, Maryland, April 2007

Derakhshani, Reza and **Trent M. Guess** "Dynamic Neural Networks for System Identification of Knee Articulations" 2007 Multiscale Modeling PI Consortium Meeting, Bethesda, Maryland, April 2007

Rayaprolu, Jyothi and **Guess, Trent**, "Controlling Quadriceps Forces Based on Predicted Retropatellar Stresses in a 3-D Dynamic Model of the Knee Joint" ", 2005 Kansas City Area Life Sciences Research Day, Overland Park, KS, April, 2005

Mayank, Rai and **Guess, Trent**, "Development of a Three Dimensional Computational Dynamic Model of the Knee Joint for a Detailed Understanding of Its Function", 2004 Joint Missouri and Kansas Academy of Science Annual Meeting, Kansas City, MO, April, 2004

Rayaprolu, Jyothi and **Guess, Trent**, "Control of Muscle Activation and Force to Minimize Stresses in the Patello-femoral Joint" ", 2004 Joint Missouri and Kansas Academy of Science Annual Meeting, Kansas City, MO, April, 2004

**Trent Guess**, "Computer Simulation and Verification of a Dynamic Knee Simulator" Presented at the 2002 Midwest Biomechanics Symposium

#### **Appearances in Popular Media:**

Duan, C. (2015, June 14). "Motion lab gets therapy patients back into the swing". *St. Louis Post-Dispatch*, pp. 1M.

Duan, C. (2015, June 2). "Motion analysis enhances therapy". *Missourian*, pp. 1A, 6A.

Chew, J. (May 04, 2015). "Detecting Knee-Cushion Problems Early Could Lead to Better Treatments". [Press Release]. <http://munews.missouri.edu/news-releases/2015/0504-detecting-knee-cushion-problems-early-could-lead-to-better-treatments/> This press release appeared in more than 30 international, national and online news outlets.

#### **Technical Reports:**

Preliminary Design of Electro-Mechanical Actuators for Continuously Variable Marine Propeller Pitch Control. Aerotech report for the Office of Naval Research, Agreement N00014-00-3-0010, August 10, 2000. (et al.)

Pitch Actuator Engineering Specification Report for Magnetostrictive Actuators for Continuously Variable Marine Propeller Pitch Control, Aerotech report for the Office of Naval Research, Agreement N00014-00-3-0010, May 10, 2000. (et al.)

Conceptual Design of Electro-Mechanical Actuators for Continuously Variable Marine Propeller Pitch Control, Aerotech report for the Office of Naval Research, Agreement N00014-00-3-0010, May 10, 2000

#### **Funded Grants**

- 2017     **Engineering Collaborator**, Clinical Collaborator J. Cook, Coulter Translational Partnership Program  
Title: Mizzou Knee Arthrometer Testing System (MKATS)  
Total Award Amount: \$61,399  
Time: August 1, 2017 – July 31, 2018
- 2017     **Engineering Collaborator**, Clinical Collaborator J. Cook, Coulter Translational Partnership Program  
Title: BioJoint Flex  
Total Award Amount: \$43,745  
Time: August 1, 2017 – July 31, 2018
- 2015     Co-Investigator, PI Prost, School of Health Professions Catalyst Award  
Title: *Improving Gait Performance of Older Adults with Walking Poles*  
Total Award Amount: \$3,450  
Time: January 1, 2016 – December 31, 2016
- 2015     **Principal Investigator**, Missouri Orthopaedic Institute Research Grant  
Title: *Joint Loading and Knee OA*  
Total Award Amount: \$10,000  
Time: August 13, 2015 – August 12, 2016
- 2015     Co-Investigator, PI Sherman, Missouri Orthopaedic Institute Research Grant  
Title: *Correlating Motion Analysis Systems and Clinical Testing to Establish an Appropriate Return to Sport Protocol Following ACL Reconstruction in Athletes*

Total Award Amount: \$10,000  
Time: January 1, 2015 – December 31, 2016

- 2014 Co-Investigator, PI Sayers, University of Missouri Research Board  
Title: *Patient-Specific Rehabilitation in Knee Osteoarthritis*  
Total Award Amount: \$34,306  
Time: September 1, 2014 – August 31, 2016
- 2014 **Principal Investigator**, National Institutes of Health, National Institute of Arthritis and Musculoskeletal and Skin Diseases, Award Number RAR061698B  
Title: *Subject Specific Concurrent Simulation of Movement and Natural Knee Contact Mechanics*  
Total Award Amount: \$137,262  
Time: September 1, 2013 – July 31, 2014
- 2014 **Principal Investigator**, School of Health Professions Post-doctoral Fellowship Funding Award  
Title: *Post-Doctoral Fellow in Musculoskeletal Biomechanics*  
Total Award Amount: Provides funding for 2 years of salary  
August 1, 2014 - July 31, 2016
- 2013 Advisory Board Member, PI Erdemir, A., National Institutes of Health, National Institute of General Medical Sciences, Award Number R01GM104139  
Title: *Open knee(s): virtual biomechanical representations of the knee joint*  
Total Award Amount: \$2,071,918  
Time: September 16, 2013 – May 31, 2017
- 2013 **Principal Investigator**, (Akin Cil, Dual PI), School of Medicine, UMKC  
Title: *Biomechanics of the Elbow and Upper-Extremity*  
Total Award Amount: \$100,000  
Time: January 1, 2013 – December 31, 2013
- 2011 **Principal Investigator**, National Institutes of Health, National Institute of Arthritis and Musculoskeletal and Skin Diseases, Award Number RAR061698A  
Title: *Subject Specific Concurrent Simulation of Movement and Natural Knee Contact Mechanics*  
Total Award Amount: \$308,602  
Time: August 1, 2011 – August 31, 2013
- 2011 **Principal Investigator**, (Akin Cil, Dual PI), School of Medicine, UMKC  
Title: *Development and Validation of a Computational Elbow Model*  
Total Award Amount: \$80,000  
Time: September 1, 2011 – August 31, 2012
- 2010 **Principal Investigator**, National Science Foundation, Award Number CMMI-1039524  
Title: *MRI: Acquisition of Mechanical Testing Equipment to Support Musculoskeletal Research and Engineering Education*  
Total Award Amount: \$234,917  
Time: January 1, 2011 – December 31, 2012
- 2009 **Principal Investigator**, Missouri Life Sciences Research Board, Award Number 09-1078  
Title: *Computational Simulation of Canine Biomechanically Induced Unicompartamental Osteoarthritis: a Concurrent Multiscale Approach*  
Total Award Amount: \$556,957  
Time: February 1, 2009 – December 31, 2012
- 2008 **Principal Investigator**, National Science Foundation, Award Number CBET-0821459  
Title: *MRI: Acquisition of an Experimental Platform to Support Research and Educational Activities in Human Motion*

Total Award Amount: \$263,685  
Time: September 1, 2008 – August 31, 2011

- 2007 **Principal Investigator**, National Science Foundation, Award Number 0748331  
Title: *REU Supplemental Award: Dynamic Simulation of Joints Using Multi-Scale Modeling*  
Total Award Amount: \$12,000  
Time: September 1, 2007 – May 31, 2008
- 2005 Co-Investigator, PI Sohraby, K., National Science Foundation, Award Number 0525538  
Title: *ARROWS: Achieving Recruitment, Retention and Outreach with STEP*  
Total Award Amount: \$999,841  
Time: October 1, 2005 - September 30, 2010
- 2005 **Principal Investigator**, National Science Foundation, Award Number CMS-0506297  
Title: *Dynamic Simulation of Joints Using Multi-Scale Modeling*  
Total Award Amount: \$441,990  
Time: September 1, 2005 - August 31, 2009
- 2005 **Principal Investigator**, University of Missouri Research Board Grant  
Title: *Neuromuscular Control of the Quadriceps: Minimization of Patellar Stress During a Squat*  
Total Award Amount: \$28,117  
Time: January 3, 2005 – December 31, 2006
- 2004 Trainee Mentor, PI Spencer, P., National Institutes of Health, Award Number R13 DK069504-01  
Title: *Dental Science Research Training Program for Engineers*  
Total Award Amount: \$648,000  
Time: September 20, 2004 – July 31, 2007
- 2004 **Principal Investigator**, Faculty Research Grant, University of Missouri – Kansas City  
Title: *Dynamic Computational Modeling of the Patello-femoral Joint: Articulating Surface Stress and Muscle Activation*  
Total Award Amount: \$6,994  
Time: June 1, 2004 – May 15, 2005